



730, 101  
CFO 10516 US

08/395588

- 1 -

1 Communication Apparatus for Selecting a  
Communication Protocol Compatible to a Partner  
Station and Executing the Selected Protocol

5 BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a communication apparatus which selects a communication protocol compatible to a partner station and executing the selected protocol.

10

Related Background Art

In prior art apparatus of this type, a facsimile apparatus <sup>is</sup> ~~has been~~ known. The communication protocol of the facsimile apparatus includes G1, G2, G3 and G4 protocols. The G4 protocol uses a digital line and the G1, G2 and G3 protocols use an analog public line. In connecting a line to a communication partner station, the facsimile apparatus sequentially sends the G3 protocol, the G2 protocol and the G1 protocol and determines which protocol is to be executed in accordance with the presence or absence of acknowledge signals to the respective sent signals.

20

However, in the above facsimile apparatus, the G3 protocol, the G2 protocol and the G1 protocol are sequentially sent and the presence or absence of the acknowledge signal thereto is checked. Accordingly, a long time is required before the communication protocol

SEARCH ROOM

A

1 to be executed is determined.

When a new communication protocol is added to the above protocols, a longer time is required before the communication protocol is determined. Where 5 signals are to be sent and received to and from the partner station, if the reception of the signal is unsuccessful, a protocol of a lower function is selected even if the partner station actually has a protocol of a higher function.

10 Information on the communication function of the partner station may be registered, together with a telephone number of the partner station, in a one-touch dial key or an abbreviated dial key. Thus, when a call is made by depressing the dial key, the 15 communication mode is selected in accordance with the registered information of the communication function (USP 4,910,506).

However, in the above USP 4,910,506, the information of the communication function registered 20 in the one touch key is not useful for a received call.

#### SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved communication apparatus in the 25 light of the above problems.

It is another object of the present invention to provide a communication apparatus which can rapidly

- 1 determine a proper communication protocol at the reception of a call in accordance with a partner or calling station.

Other objects of the present invention will  
5 be apparent from the following detailed description  
and drawings of the preferred embodiments.

#### BRIEF DESCRIPTION OF THE DRAWINGS

- Fig. 1 is composed of Figs. 1A and 1B and
- 10 ^ is shows a block diagram of a configuration of a facsimile apparatus of an embodiment according to the invention  
^ is a flow chart of the control steps
- Fig. 2 shows a flow chart of control of a control circuit 54 of Fig. 1B,  
is a flow chart of the control steps
- Fig. 3 shows a flow chart of control of the control circuit 54 of Fig. 1B,  
is a flow chart of the control steps
- 15 Fig. 4 shows a flow chart of control of the control circuit 54 of Fig. 1B;  
is a flow chart of the control steps
- Fig. 5 shows a flow chart of control of the control circuit 54 of Fig. 1B,  
is a flow chart of the control steps
- 20 Fig. 6 shows a flow chart of control of the control circuit 54 of Fig. 1B,  
is a flow chart of the control steps
- Fig. 7 shows a flow chart of control of the control circuit 54 of Fig. 1B, and  
is a flow chart of the control steps
- Fig. 8 shows a flow chart of control of the control circuit 54 of Fig. 1B.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

1 [Embodiment 1]

A  
Figs. 1A and 1B <sup>comprise</sup> show a block diagram of an embodiment of a facsimile apparatus of the present invention.

5 In Figs. 1A and 1B, numeral 2 denotes a CML relay which connects a telephone line (signal lines 2a, 2b) to a facsimile communication unit (signal lines 14a, 14b) when a signal level '1' is outputted to a signal line 54a, and connects the telephone line 10 (signal lines 2a, 2b) to a telephone set (signal lines 10a, 10b) when a signal level '0' is outputted to the signal line 54a.

Numeral 4 denotes a TEL relay for detecting non-ringing call reception and an off-hook state during 15 communication. It connects signal lines 6a, 6b to the signal lines 10a, 10b when the signal level '1' is outputted to a signal line 54b, and connects the signal lines 6a, 6b to signal lines 8a, 8b when the signal level '0' is outputted to the signal line 54b. When 20 the signal level '0' is outputted to the signal line 54b, an off-hook detection circuit 8 determines whether the telephone set is in the off-hook state or not, and if it is in the off-hook state, it outputs the signal level '0' to a signal line 8c.

25 Numeral 6 denotes a telephone set.

Numeral 10 denotes a call signal detection circuit which receives the signals on the signal lines

1 10a and 10b, and outputs the signal level '1' to the  
signal line 10a when it detects a call signal and  
outputs the signal level '0' to the signal line 10a  
when it does not detect the call signal.

5           Numeral 12 denotes a circuit for detecting  
telephone number information sent between the call  
signals. It outputs the detected telephone number  
information to a signal line 12a.

10          Numeral 14 denotes a hybrid circuit for  
separating a transmission signal from a reception  
signal. Namely, the transmission signal on a signal  
line 30a is sent to the telephone line through signal  
lines 14a, 14b and the CML relay 2. A signal sent  
from <sup>the</sup> other station is outputted to a signal line 14c  
15          through the CML relay 2 and the signal lines 14a, 14b.

20          Numeral 16 denotes a modulator for modulating  
a signal in accordance with the CCITT Recommendation  
V.21. The modulator 16 receives a protocol signal on  
a signal line 54c, modulates it and outputs the  
modulated data to a signal line 16a.

25          Numeral 18 denotes a modulator for modulating  
a signal in accordance with the CCITT Recommendation  
V.8. The modulator 18 receives a protocol signal on a  
signal line 54d, modulates it and outputs the modulated  
data to a signal line 18a.

             Numeral 20 denotes a Q-PSK modulator for a  
protocol between image transmission pages by using a

1 V.34 high speed modem. The modulator 20 receives a  
protocol signal on the signal line 54e, modulates it  
and outputs the modulated data to a signal line 20a.

Numeral 22 denotes a read circuit which  
5 sequentially reads one line of image signal along a  
main scan direction from a transmission document sheet  
to generate a signal train representing black and  
white binary signals. It comprises an image pickup  
device such as a CCD (charge coupled device) and an  
10 optical system. The black and white binary signal  
train is outputted to a signal line 22a.

Numeral 24 denotes an encoder which receives  
the read data outputted to the signal line 22a and  
outputs encoded data (MH (modified Huffmann) encoded,  
15 MR (modified READ) encoded or MMR (modified modified  
READ) encoded data) to a signal line 24a.

Numeral 26 denotes a modulator which modulates  
a signal in accordance with the known CCITT  
Recommendation V.27 ter (differential phase modulation),  
20 V.29 (quadrature modulation) or V.17. The modulator  
26 receives the signal on the signal line 24a when the  
signal level '1' is outputted to a signal line 54f,  
modulates it and outputs the modulated data to a signal  
line 26a. The modulator 26 does nothing when the  
25 signal level '0' is outputted to the signal line 54f.

Numeral 28 denotes a modulator which modulates  
a signal in accordance with the CCITT Recommendation

1 V.34. When the signal level '1' is outputted to a  
signal line 54g, the modulator 28 receives the signal  
on the signal line 24a, modulates it and outputs the  
modulated data to a signal line 28a. The modulator 28  
5 does nothing when the signal level '0' is outputted to  
the signal line 54g.

Numeral 30 denotes an adder circuit which  
receives the signals on the signal lines 16a, 18a, 20a,  
26a and 28a and outputs a sum signal to a signal line  
10 30a.

Numeral 32 denotes a demodulator which  
demodulates a signal in accordance with the known  
CCITT Recommendation V.21. The demodulator 32 receives  
the signal on a signal line 14c, demodulates it and  
15 outputs the demodulated data to a signal line 32a.

Numeral 34 denotes a demodulator which  
demodulates a signal in accordance with the CCITT  
Recommendation V.8. The demodulator 34 receives the  
signal on the signal line 14c, demodulates it and  
20 outputs the demodulated data to a signal line 34a.

Numeral 36 denotes a Q·PSK demodulator for the  
protocol between image transmission pages using the  
CCITT Recommendation V.34 high speed modem. The  
demodulator 36 receives the signal on the signal line  
25 14c, Q·PSK demodulates it and outputs the demodulated  
data to a signal line 36a.

Numeral 38 denotes a demodulator which

1 demodulates a signal in accordance with the known  
CCITT Recommendation V.27 ter (phase difference  
modulation), V.29 (quadrature modulation) or V.17.  
The demodulator 38 receives the signal on the signal  
5 line 14c, demodulates it and outputs the demodulated  
data to a signal line 38a.

Numeral 40 denotes a demodulator which  
demodulates a signal in accordance with the CCITT  
Recommendation V.34. The demodulator 40 receives the  
10 signal on the signal line 14c, demodulates it and  
outputs the demodulated data to a signal line 40a.

Numeral 42 denotes a decoder circuit which  
receives the signal outputted to the signal line 38a  
when the signal level '0' is outputted to a signal  
line 54h, receives the signal outputted to the signal  
15 line 40a when the signal level '1' is outputted to the  
signal line 54h, and outputs encoded data (MH  
(modified Huffmann) encoded, MR (modified READ)  
encoded or MMR (modified modified READ) encoded data)  
20 to a signal line 42a.

Numeral 44 denotes a record circuit which  
receives the data outputted to the signal line 42a and  
sequentially records it one line at a time.

A Numeral 46 denotes <sup>a</sup> circuit which stores  
25 communication systems (particularly, the communication  
systems in accordance with V.21, V.27 ter, V.29 and  
V.17 or the communication systems in accordance with

1 V.8 and V.34) in association with a telephone number of  
a transmit station (copartner or calling station) sent  
between call signals.

Numeral 48 denotes a circuit which stores the  
5 data of registration of the communication system  
through a signal line 48a in association with the  
telephone number of the calling station sent between  
call signals.

Numeral 50 denotes a circuit which counts the  
10 number of times of communication (reception) after the  
registration of the communication system through a  
signal line 50a in association with the telephone  
number of the calling station sent between call  
signals.

15 Numeral 52 denotes a console unit having a  
registration button used to store the communication  
system in association with the telephone number of the  
calling station sent between call signals, a ten-key,  
one-touch dial keys, abbreviation dial keys, a sent  
20 key, a start key and other function keys. The  
information corresponding to the depressed key is  
outputted to a signal line 52a.

Numeral 54 denotes a control circuit which,  
in the facsimile apparatus capable of detecting the  
25 telephone number information sent between call signals,  
<sup>the information of the</sup>  
has means for storing <sub>A</sub> the communication system for  
the calling station in accordance with the telephone

1 number information and call signal detection means and  
primarily controls the start of the communication by  
the stored communication system in accordance with  
the telephone number information sent between call  
5 signals when the call signal is detected. The  
communication systems may be the communication systems  
based on V.21, V.27 ter, V.29 and V.17 or the communica-  
cation systems based on V.8 and V.34.

A  
A60  
A62  
A64  
A66  
A68  
A70  
A72  
A74  
A76  
A78  
A80  
A82  
A84  
A86  
A88  
A90  
A92  
A94  
A96  
A98  
A100  
A102  
A104  
A106  
A108  
A110  
A112  
A114  
A116  
A118  
A120  
A122  
A124  
A126  
A128  
A130  
A132  
A134  
A136  
A138  
A140  
A142  
A144  
A146  
A148  
A150  
A152  
A154  
A156  
A158  
A160  
A162  
A164  
A166  
A168  
A170  
A172  
A174  
A176  
A178  
A180  
A182  
A184  
A186  
A188  
A190  
A192  
A194  
A196  
A198  
A200  
A202  
A204  
A206  
A208  
A210  
A212  
A214  
A216  
A218  
A220  
A222  
A224  
A226  
A228  
A230  
A232  
A234  
A236  
A238  
A240  
A242  
A244  
A246  
A248  
A250  
A252  
A254  
A256  
A258  
A260  
A262  
A264  
A266  
A268  
A270  
A272  
A274  
A276  
A278  
A280  
A282  
A284  
A286  
A288  
A290  
A292  
A294  
A296  
A298  
A300  
A302  
A304  
A306  
A308  
A310  
A312  
A314  
A316  
A318  
A320  
A322  
A324  
A326  
A328  
A330  
A332  
A334  
A336  
A338  
A340  
A342  
A344  
A346  
A348  
A350  
A352  
A354  
A356  
A358  
A360  
A362  
A364  
A366  
A368  
A370  
A372  
A374  
A376  
A378  
A380  
A382  
A384  
A386  
A388  
A390  
A392  
A394  
A396  
A398  
A400  
A402  
A404  
A406  
A408  
A410  
A412  
A414  
A416  
A418  
A420  
A422  
A424  
A426  
A428  
A430  
A432  
A434  
A436  
A438  
A440  
A442  
A444  
A446  
A448  
A450  
A452  
A454  
A456  
A458  
A460  
A462  
A464  
A466  
A468  
A470  
A472  
A474  
A476  
A478  
A480  
A482  
A484  
A486  
A488  
A490  
A492  
A494  
A496  
A498  
A500  
A502  
A504  
A506  
A508  
A510  
A512  
A514  
A516  
A518  
A520  
A522  
A524  
A526  
A528  
A530  
A532  
A534  
A536  
A538  
A540  
A542  
A544  
A546  
A548  
A550  
A552  
A554  
A556  
A558  
A560  
A562  
A564  
A566  
A568  
A570  
A572  
A574  
A576  
A578  
A580  
A582  
A584  
A586  
A588  
A590  
A592  
A594  
A596  
A598  
A600  
A602  
A604  
A606  
A608  
A610  
A612  
A614  
A616  
A618  
A620  
A622  
A624  
A626  
A628  
A630  
A632  
A634  
A636  
A638  
A640  
A642  
A644  
A646  
A648  
A650  
A652  
A654  
A656  
A658  
A660  
A662  
A664  
A666  
A668  
A670  
A672  
A674  
A676  
A678  
A680  
A682  
A684  
A686  
A688  
A690  
A692  
A694  
A696  
A698  
A700  
A702  
A704  
A706  
A708  
A710  
A712  
A714  
A716  
A718  
A720  
A722  
A724  
A726  
A728  
A730  
A732  
A734  
A736  
A738  
A740  
A742  
A744  
A746  
A748  
A750  
A752  
A754  
A756  
A758  
A760  
A762  
A764  
A766  
A768  
A770  
A772  
A774  
A776  
A778  
A780  
A782  
A784  
A786  
A788  
A790  
A792  
A794  
A796  
A798  
A800  
A802  
A804  
A806  
A808  
A810  
A812  
A814  
A816  
A818  
A820  
A822  
A824  
A826  
A828  
A830  
A832  
A834  
A836  
A838  
A840  
A842  
A844  
A846  
A848  
A850  
A852  
A854  
A856  
A858  
A860  
A862  
A864  
A866  
A868  
A870  
A872  
A874  
A876  
A878  
A880  
A882  
A884  
A886  
A888  
A890  
A892  
A894  
A896  
A898  
A900  
A902  
A904  
A906  
A908  
A910  
A912  
A914  
A916  
A918  
A920  
A922  
A924  
A926  
A928  
A930  
A932  
A934  
A936  
A938  
A940  
A942  
A944  
A946  
A948  
A950  
A952  
A954  
A956  
A958  
A960  
A962  
A964  
A966  
A968  
A970  
A972  
A974  
A976  
A978  
A980  
A982  
A984  
A986  
A988  
A990  
A992  
A994  
A996  
A998  
A1000  
A1002  
A1004  
A1006  
A1008  
A1010  
A1012  
A1014  
A1016  
A1018  
A1020  
A1022  
A1024  
A1026  
A1028  
A1030  
A1032  
A1034  
A1036  
A1038  
A1040  
A1042  
A1044  
A1046  
A1048  
A1050  
A1052  
A1054  
A1056  
A1058  
A1060  
A1062  
A1064  
A1066  
A1068  
A1070  
A1072  
A1074  
A1076  
A1078  
A1080  
A1082  
A1084  
A1086  
A1088  
A1090  
A1092  
A1094  
A1096  
A1098  
A1100  
A1102  
A1104  
A1106  
A1108  
A1110  
A1112  
A1114  
A1116  
A1118  
A1120  
A1122  
A1124  
A1126  
A1128  
A1130  
A1132  
A1134  
A1136  
A1138  
A1140  
A1142  
A1144  
A1146  
A1148  
A1150  
A1152  
A1154  
A1156  
A1158  
A1160  
A1162  
A1164  
A1166  
A1168  
A1170  
A1172  
A1174  
A1176  
A1178  
A1180  
A1182  
A1184  
A1186  
A1188  
A1190  
A1192  
A1194  
A1196  
A1198  
A1200  
A1202  
A1204  
A1206  
A1208  
A1210  
A1212  
A1214  
A1216  
A1218  
A1220  
A1222  
A1224  
A1226  
A1228  
A1230  
A1232  
A1234  
A1236  
A1238  
A1240  
A1242  
A1244  
A1246  
A1248  
A1250  
A1252  
A1254  
A1256  
A1258  
A1260  
A1262  
A1264  
A1266  
A1268  
A1270  
A1272  
A1274  
A1276  
A1278  
A1280  
A1282  
A1284  
A1286  
A1288  
A1290  
A1292  
A1294  
A1296  
A1298  
A1300  
A1302  
A1304  
A1306  
A1308  
A1310  
A1312  
A1314  
A1316  
A1318  
A1320  
A1322  
A1324  
A1326  
A1328  
A1330  
A1332  
A1334  
A1336  
A1338  
A1340  
A1342  
A1344  
A1346  
A1348  
A1350  
A1352  
A1354  
A1356  
A1358  
A1360  
A1362  
A1364  
A1366  
A1368  
A1370  
A1372  
A1374  
A1376  
A1378  
A1380  
A1382  
A1384  
A1386  
A1388  
A1390  
A1392  
A1394  
A1396  
A1398  
A1400  
A1402  
A1404  
A1406  
A1408  
A1410  
A1412  
A1414  
A1416  
A1418  
A1420  
A1422  
A1424  
A1426  
A1428  
A1430  
A1432  
A1434  
A1436  
A1438  
A1440  
A1442  
A1444  
A1446  
A1448  
A1450  
A1452  
A1454  
A1456  
A1458  
A1460  
A1462  
A1464  
A1466  
A1468  
A1470  
A1472  
A1474  
A1476  
A1478  
A1480  
A1482  
A1484  
A1486  
A1488  
A1490  
A1492  
A1494  
A1496  
A1498  
A1500  
A1502  
A1504  
A1506  
A1508  
A1510  
A1512  
A1514  
A1516  
A1518  
A1520  
A1522  
A1524  
A1526  
A1528  
A1530  
A1532  
A1534  
A1536  
A1538  
A1540  
A1542  
A1544  
A1546  
A1548  
A1550  
A1552  
A1554  
A1556  
A1558  
A1560  
A1562  
A1564  
A1566  
A1568  
A1570  
A1572  
A1574  
A1576  
A1578  
A1580  
A1582  
A1584  
A1586  
A1588  
A1590  
A1592  
A1594  
A1596  
A1598  
A1600  
A1602  
A1604  
A1606  
A1608  
A1610  
A1612  
A1614  
A1616  
A1618  
A1620  
A1622  
A1624  
A1626  
A1628  
A1630  
A1632  
A1634  
A1636  
A1638  
A1640  
A1642  
A1644  
A1646  
A1648  
A1650  
A1652  
A1654  
A1656  
A1658  
A1660  
A1662  
A1664  
A1666  
A1668  
A1670  
A1672  
A1674  
A1676  
A1678  
A1680  
A1682  
A1684  
A1686  
A1688  
A1690  
A1692  
A1694  
A1696  
A1698  
A1700  
A1702  
A1704  
A1706  
A1708  
A1710  
A1712  
A1714  
A1716  
A1718  
A1720  
A1722  
A1724  
A1726  
A1728  
A1730  
A1732  
A1734  
A1736  
A1738  
A1740  
A1742  
A1744  
A1746  
A1748  
A1750  
A1752  
A1754  
A1756  
A1758  
A1760  
A1762  
A1764  
A1766  
A1768  
A1770  
A1772  
A1774  
A1776  
A1778  
A1780  
A1782  
A1784  
A1786  
A1788  
A1790  
A1792  
A1794  
A1796  
A1798  
A1800  
A1802  
A1804  
A1806  
A1808  
A1810  
A1812  
A1814  
A1816  
A1818  
A1820  
A1822  
A1824  
A1826  
A1828  
A1830  
A1832  
A1834  
A1836  
A1838  
A1840  
A1842  
A1844  
A1846  
A1848  
A1850  
A1852  
A1854  
A1856  
A1858  
A1860  
A1862  
A1864  
A1866  
A1868  
A1870  
A1872  
A1874  
A1876  
A1878  
A1880  
A1882  
A1884  
A1886  
A1888  
A1890  
A1892  
A1894  
A1896  
A1898  
A1900  
A1902  
A1904  
A1906  
A1908  
A1910  
A1912  
A1914  
A1916  
A1918  
A1920  
A1922  
A1924  
A1926  
A1928  
A1930  
A1932  
A1934  
A1936  
A1938  
A1940  
A1942  
A1944  
A1946  
A1948  
A1950  
A1952  
A1954  
A1956  
A1958  
A1960  
A1962  
A1964  
A1966  
A1968  
A1970  
A1972  
A1974  
A1976  
A1978  
A1980  
A1982  
A1984  
A1986  
A1988  
A1990  
A1992  
A1994  
A1996  
A1998  
A2000  
A2002  
A2004  
A2006  
A2008  
A2010  
A2012  
A2014  
A2016  
A2018  
A2020  
A2022  
A2024  
A2026  
A2028  
A2030  
A2032  
A2034  
A2036  
A2038  
A2040  
A2042  
A2044  
A2046  
A2048  
A2050  
A2052  
A2054  
A2056  
A2058  
A2060  
A2062  
A2064  
A2066  
A2068  
A2070  
A2072  
A2074  
A2076  
A2078  
A2080  
A2082  
A2084  
A2086  
A2088  
A2090  
A2092  
A2094  
A2096  
A2098  
A2100  
A2102  
A2104  
A2106  
A2108  
A2110  
A2112  
A2114  
A2116  
A2118  
A2120  
A2122  
A2124  
A2126  
A2128  
A2130  
A2132  
A2134  
A2136  
A2138  
A2140  
A2142  
A2144  
A2146  
A2148  
A2150  
A2152  
A2154  
A2156  
A2158  
A2160  
A2162  
A2164  
A2166  
A2168  
A2170  
A2172  
A2174  
A2176  
A2178  
A2180  
A2182  
A2184  
A2186  
A2188  
A2190  
A2192  
A2194  
A2196  
A2198  
A2200  
A2202  
A2204  
A2206  
A2208  
A2210  
A2212  
A2214  
A2216  
A2218  
A2220  
A2222  
A2224  
A2226  
A2228  
A2230  
A2232  
A2234  
A2236  
A2238  
A2240  
A2242  
A2244  
A2246  
A2248  
A2250  
A2252  
A2254  
A2256  
A2258  
A2260  
A2262  
A2264  
A2266  
A2268  
A2270  
A2272  
A2274  
A2276  
A2278  
A2280  
A2282  
A2284  
A2286  
A2288  
A2290  
A2292  
A2294  
A2296  
A2298  
A2300  
A2302  
A2304  
A2306  
A2308  
A2310  
A2312  
A2314  
A2316  
A2318  
A2320  
A2322  
A2324  
A2326  
A2328  
A2330  
A2332  
A2334  
A2336  
A2338  
A2340  
A2342  
A2344  
A2346  
A2348  
A2350  
A2352  
A2354  
A2356  
A2358  
A2360  
A2362  
A2364  
A2366  
A2368  
A2370  
A2372  
A2374  
A2376  
A2378  
A2380  
A2382  
A2384  
A2386  
A2388  
A2390  
A2392  
A2394  
A2396  
A2398  
A2400  
A2402  
A2404  
A2406  
A2408  
A2410  
A2412  
A2414  
A2416  
A2418  
A2420  
A2422  
A2424  
A2426  
A2428  
A2430  
A2432  
A2434  
A2436  
A2438  
A2440  
A2442  
A2444  
A2446  
A2448  
A2450  
A2452  
A2454  
A2456  
A2458  
A2460  
A2462  
A2464  
A2466  
A2468  
A2470  
A2472  
A2474  
A2476  
A2478  
A2480  
A2482  
A2484  
A2486  
A2488  
A2490  
A2492  
A2494  
A2496  
A2498  
A2500  
A2502  
A2504  
A2506  
A2508  
A2510  
A2512  
A2514  
A2516  
A2518  
A2520  
A2522  
A2524  
A2526  
A2528  
A2530  
A2532  
A2534  
A2536  
A2538  
A2540  
A2542  
A2544  
A2546  
A2548  
A2550  
A2552  
A2554  
A2556  
A2558  
A2560  
A2562  
A2564  
A2566  
A2568  
A2570  
A2572  
A2574  
A2576  
A2578  
A2580  
A2582  
A2584  
A2586  
A2588  
A2590  
A2592  
A2594  
A2596  
A2598  
A2600  
A2602  
A2604  
A2606  
A2608  
A2610  
A2612  
A2614  
A2616  
A2618  
A2620  
A2622  
A2624  
A2626  
A2628  
A2630  
A2632  
A2634  
A2636  
A2638  
A2640  
A2642  
A2644  
A2646  
A2648  
A2650  
A2652  
A2654  
A2656  
A2658  
A2660  
A2662  
A2664  
A2666  
A2668  
A2670  
A2672  
A2674  
A2676  
A2678  
A2680  
A2682  
A2684  
A2686  
A2688  
A2690  
A2692  
A2694  
A2696  
A2698  
A2700  
A2702  
A2704  
A2706  
A2708  
A2710  
A2712  
A2714  
A2716  
A2718  
A2720  
A2722  
A2724  
A2726  
A2728  
A2730  
A2732  
A2734  
A2736  
A2738  
A2740  
A2742  
A2744  
A2746  
A2748  
A2750  
A2752  
A2754  
A2756  
A2758  
A2760  
A2762  
A2764  
A2766  
A2768  
A2770  
A2772  
A2774  
A2776  
A2778  
A2780  
A2782  
A2784  
A2786  
A2788  
A2790  
A2792  
A2794  
A2796  
A2798  
A2800  
A2802  
A2804  
A2806  
A2808  
A2810  
A2812  
A2814  
A2816  
A2818  
A2820  
A2822  
A2824  
A2826  
A2828  
A2830  
A2832  
A2834  
A2836  
A2838  
A2840  
A2842  
A2844  
A2846  
A2848  
A2850  
A2852  
A2854  
A2856  
A2858  
A2860  
A2862  
A2864  
A2866  
A2868  
A2870  
A2872  
A2874  
A2876  
A2878  
A2880  
A2882  
A2884  
A2886  
A2888  
A2890  
A2892  
A2894  
A2896  
A2898  
A2900  
A2902  
A2904  
A2906  
A2908  
A2910  
A2912  
A2914  
A2916  
A2918  
A2920  
A2922  
A2924  
A2926  
A2928  
A2930  
A2932  
A2934  
A2936  
A2938  
A2940  
A2942  
A2944  
A2946  
A2948  
A2950  
A2952  
A2954  
A2956  
A2958  
A2960  
A2962  
A2964  
A2966  
A2968  
A2970  
A2972  
A2974  
A2976  
A2978  
A2980  
A2982  
A2984  
A2986  
A2988  
A2990  
A2992  
A2994  
A2996  
A2998  
A3000  
A3002  
A3004  
A3006  
A3008  
A3010  
A3012  
A3014  
A3016  
A3018  
A3020  
A3022  
A3024  
A3026  
A3028  
A3030  
A3032  
A3034  
A3036  
A3038  
A3040  
A3042  
A3044  
A3046  
A3048  
A3050  
A3052  
A3054  
A3056  
A3058  
A3060  
A3062  
A3064  
A3066  
A3068  
A3070  
A3072  
A3074  
A3076  
A3078  
A3080  
A3082  
A3084  
A3086  
A3088  
A3090  
A3092  
A3094  
A3096  
A3098  
A3100  
A3102  
A3104  
A3106  
A3108  
A3110  
A3112  
A3114  
A3116  
A3118  
A3120  
A3122  
A3124  
A3126  
A3128  
A3130  
A3132  
A3134  
A3136  
A3138  
A3140  
A3142  
A3144  
A3146  
A3148  
A3150  
A3152  
A3154  
A3156  
A3158  
A3160  
A3162  
A3164  
A3166  
A3168  
A3170  
A3172  
A3174  
A3176  
A3178  
A3180  
A3182  
A3184  
A3186  
A3188  
A3190  
A3192  
A3194  
A3196  
A3198  
A3200  
A3202  
A3204  
A3206  
A3208  
A3210  
A3212  
A3214  
A3216  
A3218  
A3220  
A3222  
A3224  
A3226  
A3228  
A3230  
A3232  
A3234  
A3236  
A3238  
A3240  
A3242  
A3244  
A3246  
A3248  
A3250  
A3252  
A3254  
A3256  
A3258  
A3260  
A3262  
A3264  
A3266  
A3268  
A3270  
A3272  
A3274  
A3276  
A3278  
A3280  
A3282  
A3284  
A3286  
A3288  
A3290  
A3292  
A3294  
A3296  
A3298  
A3300  
A3302  
A3304  
A3306  
A3308  
A3310  
A3312  
A3314  
A3316  
A3318  
A3320  
A3322  
A3324  
A3326  
A3328  
A3330  
A3332  
A3334  
A3336  
A3338  
A3340  
A3342  
A3344  
A3346  
A3348  
A3350  
A3352  
A3354  
A3356  
A3358  
A3360  
A3362  
A3364  
A3366  
A3368  
A3370  
A3372  
A3374  
A3376  
A3378  
A3380  
A3382  
A3384  
A3386  
A3388  
A3390  
A3392  
A3394  
A33

1 to the signal line 54h to set a state in which decoder  
circuit 42 receives the signal on the signal line 40a.

In a step S72, whether the registration of the communication system in association with the telephone number between call signals has been selected or not is determined, and if the registration has been selected, the process proceeds to a step S74 to register the communication system (the first communication system based on V.21, V.27 ter, V.29 and V.17 or the second communication system based on V.8 and V.34) in association with the telephone number of the call signal to the circuit 46, and if the registration has not been selected, the process proceeds to a step S76.

15 In the step S76, the information on the signal line 10a is received and whether the call signal has been detected or not is determined. If the call signal has been detected, the process proceeds to a step S80, and if the call signal has not been detected, 20 the process proceeds to a step S78 to execute other processes  
process.  
A — ^

In the step S80, the information of the circuit 46 is checked to determine whether the telephone number between call signals is for the first communication system based on V.21, V.27 ter, V.29 and V.17, 25 and if it is for the first communication system based on V.21, V.27 ter, V.29 and V.17, the process proceeds

1 to a step S82, and if it is for the second communication  
system based on V.8 and V.34, the process proceeds to  
a step S96.

In the step S82, the signal level '1' is  
5 outputted to the signal line 54f to set a state which  
uses the V.27 ter, V.29 or V.17 modulator 26.

In the step S84, the signal level '0' is  
outputted to the signal line 54g to set a state which  
does not use the V.34 modulator 28.

10 In a step S86, the signal level '0' is  
outputted to the signal line 54h to set a state in  
which the decoder circuit 42 receives the information  
on the signal line 38a.

In a step S88 of Fig. 3, the signal level '1'  
15 is outputted to the signal line 54a to turn on the  
CML relay 2.

A step S90 represents a pre-protocol based on  
V.21.

A step S92 executes image transmission in  
20 accordance with V.27 ter, V.29 or V.17.

A step S94 executes a post protocol based on  
V.21.

In a step S96, the signal level '1' is outputted  
to the signal line 54a to turn on the CML relay 2.

25 A step S98 executes a pre-protocol based on  
V.8.

A step S100 executes image transmission in

1 accordance with V.34. A Q·PSK protocol is executed  
between pages.

A step S102 executes a post protocol in  
accordance with Q·PSK.

5 In accordance with the Embodiment 1, the  
communication system of the calling station is stored  
in the memory circuit 46 in association with the  
telephone number between call signals which allows  
the identification of the telephone number of the  
10 calling station prior to the line connection, the  
telephone number between call signals is detected  
before the line connection, the communication system  
of the calling station for the detected telephone  
number is read from the memory circuit 46, the  
15 communication system of its own apparatus is set to be  
compatible to the communication system of the calling  
station before the line connection, and the communica-  
tion is started. Thus, in the apparatus having a  
plurality of totally different communication systems  
20 such as the communication system based on V.27 ter,  
V.29 and V.17 and the communication system based on  
V.34, the pre-protocol with the calling station can  
be shortened and the communication cost can be reduced.

A (In the apparatus having the totally different  
25 communication systems, normally, the predetermined  
pre-protocols are sequentially executed for each  
communication system to detect the communication

1 system of the calling station, and the pre-protocol  
time is long.)

Further, a chance to misrecognize the communication system of the calling station is reduced.

5 [Embodiment 2]

In the above embodiment, when the detected telephone number between call signals is not registered in the circuit 46, or when the telephone number is not sent between call signals, the pre-protocol based on 10 V.8 may be executed and the image transmission by V.27 ter, V.29 or V.17 or the image transmission by V.34 may be determined in accordance with the ability of the calling station.

A specific example of the above control is 15 shown in Fig. 4 for those portions which are different from the flow charts of Figs. 2 and 3.

In the decision in the step S76 of Fig. 2 is YES, the process proceeds to a step S112.

In the step S112, the information on the 20 signal line 12a is received and whether the telephone number is present between call signals and the detected telephone number is registered in the circuit 46 or not is determined. If YES, the process proceeds to the step S80 of Fig. 2, and if NO, the process 25 proceeds to a step S116.

In a step S116, the signal level '1' is outputted to the signal line 54a to turn on the CML

1 relay 2, that is, connect the signal lines 2a and 2b  
to the signal lines 14a and 14b.

A step S118 executes a pre-protocol based on  
V.8. The communication system of the calling station  
5 is determined based on the signal received in the V.8  
pre-protocol.

In a step S120, whether the V.34 function is  
equipped or not is determined. If it is equipped,  
the process proceeds to the step S100 of Fig. 3 to  
10 execute the image transmission by V.34, and if it is  
not equipped, the process proceeds to the step S82 of  
Fig. 2.

In accordance with the Embodiment 2, if the  
telephone number between call signals is not sent or  
15 the telephone number of the calling station is not  
registered, the communication by V.8 is executed so  
that the communication can be shifted to any communica-  
tion system. Thus, a case in which the communication  
with the calling station is not established because  
20 the communication system is not identified before the  
line connection is avoided.

[Embodiment 3]

In the above embodiment, when a call is  
received from the telephone number between call  
25 signals for the first time, the communication may be  
executed by the communication system which allows any  
communication system because the mode of the calling

A 1 station is not known, and that communication system is stored, and when a predetermined time is elapsed or a predetermined call reception circuit operates, the communication system is again determined for the same information  
A 5 calling station and it is stored.

A specific example of the above control is shown in Figs. 5 and 6 for those portions which are different from the flow charts of Figs. 2 and 3.

When the decision in the step S76 of Fig. 2 is  
10 YES, the process proceeds to a step S132.

In the step S132, the information on the signal line 12a is received and whether the telephone number between call signals is sent or not is determined. If it is sent, the process proceeds to a  
15 step S136, and if it is not sent, the process proceeds to the step S116 of Fig. 4.

In the step S136, whether the telephone number between call signals is registered in the circuit 46 or not is determined. If it is registered, the process  
20 proceeds to a step S152, and if it is not registered, the process proceeds to a step S138.

In the step S138, the signal level '1' is outputted to the signal line 54a to turn on the CML relay 2, that is, connect the signal lines 2a and 2b  
25 to the signal lines 14a and 14b.

A step S140 executes a pre-protocol based on V.8. In the V.8 pre-protocol, the communication

1 system of the calling station is determined.

In a step S142, whether the V.34 function is equipped or not is determined, and if it is equipped, the process proceeds to a step S144. If it is not 5 equipped, the process proceeds to a step S146.

In the step S144, the communication system by V.8 or V.34 in association with the detected telephone number between call signals is registered.

In the step S146, the communication system by 10 V.21, V.27 ter, V.29 or V.17 in association with the detected telephone number between call signals is registered in the circuit 46.

In a step S148, the date of registration in association with the detected telephone number between 15 call signals is stored in the circuit 48 and a reception counter in the circuit 50 is cleared. Then, the process proceeds to the step S80 of Fig. 3.

In a step S152 of Fig. 6, the information in the circuit 48 is read to determine whether the 20 telephone number between call signals has elapsed one half year from the registration date or not. If it <sup>has</sup> <sub>is</sub>, the process proceeds to a step S138, and if it <sup>has</sup> <sub>is</sub> not, A A the process proceeds to a step S154.

In the step S154, the information in the 25 circuit 50 is read to determine whether the telephone number between call signals has been received over 200 time or not. If it <sup>has</sup> <sub>is</sub>, the process proceeds to a step A

- A 1 S138, and if it <sup>has</sup> <sub>is</sub> not, the process proceeds to a step  
S156.

In the step S156, the reception counter is incremented by one in association with the detected telephone number between call signals and it is registered in the circuit 50. Then, the process proceeds to the step S80 of Fig. 2.

The process proceeds from the step S70 of Fig. 2 to the step S76 of Fig. 2 and the steps S72 and S74 are not executed.

In accordance with the Embodiment 4, the communication system by V.8 which permits the shift to any communication system is set for the first communicating calling station to prevent the occurrence of communication error due to incompatibility of the communication system with the calling station at the first communication.

A Further, since the communication system which resulted in the successful communication with the calling station is stored in association with the telephone number of the calling station, the communication system can be established before the line connection at the next communication with that calling station and the pre-protocol time is shortened and the communication cost is reduced.

[Embodiment 4]

In the Embodiment 3, when calling is selected

1 for the telephone number information having the  
information  
communication system of the calling station stored in  
association with the telephone number information  
between call signals, that communication system may  
information  
be stored.

A specific example of the above control is shown in Fig. 7 for those portions which are different from the control flow charts of Figs. 5 and 6.

In the Embodiment 4, the process proceeds from the step S78 of Fig. 2 to a step S166.

In the step S166, whether calling has been selected or not is determined. If it ^ is selected, the process proceeds to a step S168, and if it ^ is not selected, the process proceeds to the step S62 of Fig. 2.

In the step S168, a designated station is called.

In a step S170, the signal level '1' is outputted to the signal line 54a to turn on the CML relay 2.

In a step S172, whether the designated station is registered in the circuit 46 or not is determined. If it is registered, the process proceeds to a step S174, and if it is not registered, the process proceeds to a step S192.

The step S174 executes a pre-protocol. When the V.8 pre-protocol signal from a called station is

- 1 to be detected, the V.8 pre-protocol is executed, and when the V.21 protocol signal from the called station is to be detected, the V.21 pre-protocol is executed.
- 5 In a step S176, the image transmission is executed. The image is transmitted by the communication system (V.27 ter, V.29, V.17 or V.34) determined in the pre-protocol.
- A step S178 executes a post protocol.
- 10 In a step S180, the signal level '0' is outputted to the signal line 54a to turn off the CML relay 2.
- In a step S182, whether the image transmission was by V.34 or not is determined, and if it was, the process proceeds to a step S184, and if it was by V.27 ter, V.29 or V.17, the process proceeds to a step S186.
- The step S184 is same as the step S144 of Fig. 5, the step S186 is same as the step S146 of Fig. 5, and the step S188 is same as the step S148 of Fig. 5.
- 20 The process proceeds from the step S188 to the step S62 of Fig. 2.
- In accordance with the Embodiment 4, when the call is made to the station registered in the circuit 46, the communication system used for the communication information is stored in the circuit 46 in association with the communicated station after the completion of the communication. Thus, the content of the circuit 46 is

1 updated at the transmission and the calling station can rapidly conform to the change of function by the updating of the called station.

### [ Embodiment 5 ]

5 In the Embodiment 4, when the call is selected,  
the communication system<sup>information</sup> may be stored even for the  
telephone number information having the communication  
system<sup>information</sup> of the called station not stored, in accordance  
with the telephone number information between call  
signals.

A specific example of the above control is shown in Fig. 8 for those portions which are different from the control flow chart of Fig. 7.

The process proceeds from the step S170 of Fig. 15 7 to a step S174.

In accordance with the Embodiment 5, when the call is made to the station, not stored in the circuit 46, the communication system used in the communication with the called station is stored in association with the telephone number information of the called station after the completion of the communication. Thus, once called, the communication system is automatically stored in the circuit 46 and an operator time is saved.

In the embodiments described above, as the  
information  
25 communication system<sub>N</sub> (communication protocol) which is  
previously stored in association with the telephone  
number of the calling station received at the time of

1 reception of call, V.21, V.27 ter, V.29 and V.17 (G3  
T.30 protocol) and V.8 and V.34 (high speed protocol)  
have been discussed. However, the protocols to be  
registered are not limited to those but the protocols  
5 of G1, G2, G3, G4, V.8 and V.34 may be added, or the  
communication protocols of teletex, telex and computer  
communication in addition to the facsimile apparatus  
may be added.

It should be understood that the present  
10 invention is not limited to the above embodiments <sup>and that</sup> ~~but~~  
various modifications may be made.

15

20

25